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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MARCH 11, 1944

Future Scientists Visit White House

See Page 166

A SCIENCE SERVICE PUBLICATION

KEEPING UP WITH *Electricity*

1000 REVOLUTIONS PER SECOND! That's the speed of newest Westinghouse motor, producing a tool surface speed of 7,000 feet per minute. This 4 horsepower induction motor has a rotor only 2 inches long, diameter 1¾ inches. Westinghouse engineers are now developing a motor to go *twice as fast.*

B'R'R'R'R'R . . . A polar bear would be right at home at 20° below zero in the Westinghouse "igloo" at East Pittsburgh. This cold chamber is 1500 times as large as the average electric home refrigerator. Here, Westinghouse engineers test ice-coated circuit breakers and other electrical switching equipment, to guarantee operation under worst winter conditions.

HIGH LIFE IS HARD on carbon generator brushes in high-flying bombers. They used to wear down to the pigtails in an hour or two, at 30,000 feet. Now Westinghouse engineers have developed a chemical treatment that keeps the brush face lubricated at substratosphere heights. Result: *fifty-fold* increase in brush life . . . enough for a dozen raids over Berlin.

EVER SEE A MILLIONTH of an inch? Probably you never will—but the Electrigage can *feel* as little as twelve millionths. Developed by Westinghouse and Sheffield Corporation, it can measure with a precision equal to finding an error of three-quarters of an inch in a mile. Infinitesimal movement of gauging stylus induces a tiny current, which is amplified 10,000 times.

AIR IS HEAVY STUFF when you start pushing it around at 400 miles an hour. That's why U. S. Army needed a 40,000 horsepower electric motor to create a man-made hurricane, for testing airplanes in Wright Field wind tunnel. It is the world's largest wound-rotor induction motor, designed and built by Westinghouse engineers.

Chemical analyses—*right now!*

Above is the laboratory model of the Westinghouse mass spectrometer, which sorts out dissimilar molecules according to their mass, and does it almost as fast as you can snap your fingers.

The mass spectrometer provides a new way to get the quick, accurate analyses that are needed to maintain precise process control. Take the synthetic rubber industry, for example. Formerly, five men took as long as three days to complete necessary chemical tests in the processing of artificial rubber—which meant that the results were often too late to be useful.

The new electronic "chemist," the Westinghouse mass spectrometer, now makes these tests in about 15 minutes.

For leadership in the electrical solution of industry's problems, look to Westinghouse. *Westinghouse Electric & Manufacturing Company, Pittsburgh 30, Pennsylvania.*

Tune in John Charles Thomas, NBC, Sundays, 2:30 p.m., E.W.T.

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

ENDOCRINOLOGY

Growth Hormone Isolated

Substance obtained from pituitary appears to be pure, since tests on rats showed it stimulated growth but had no other effects. Is a protein.

➤ ISOLATION of the growth-stimulating hormone from the pituitary gland, best known to the public through circus giants and dwarfs, is announced by Dr. Choh Hao Li and Dr. Herbert M. Evans, of the University of California. (*Science*, March 3)

Many extracts of a growth-stimulating substance have heretofore been obtained from this gland but apparently none of them has been the hormone itself completely free from other chemicals or hormones produced by this gland.

The California scientists report that the substance they have isolated appears to be a single substance and that it is a protein. Tests on rats showed that it stimulated growth but had no effect on the mammary, thyroid, adrenal or sex glands which indicates that it is "substantially free of other biologically active pituitary contaminants."

Over-production of this growth hormone by the pituitary gland results in giants or in the gorilla-like transformation of the disease, acromegaly. When the pituitary gland disorder goes in the opposite direction, so that too little growth hormone is produced, the result is dwarfism. Not all dwarfs, however, owe their small size to underactive pituitary glands.

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MEDICINE

Onion Paste Helps Wounds

Vapors of bacteria-killing substances in oils of common vegetable, applied as a dressing, speed healing of amputated limbs and clean up infection.

➤ PROMISING results with onion paste used as a dressing for infected wounds are reported by Dr. I. V. Toroptsev and Dr. A. G. Filatova, of the Tomsk State University and the All-Union Institute of Experimental Medicine, USSR. (*American Review of Soviet Medicine*, February)

The experiments with onion paste as a weapon against infection and an aid to healing of wounds followed reports by Dr. B. Tokin, that the essential oils of onions, garlic and other certain strong-scented vegetables contain substances that kill bacteria, protozoa, and even larger organisms like yeast cells and the eggs of certain lower animals. (*See SNL*, Feb. 12)

The bacteria-killing substances are called phytoncides. They have not yet been identified chemically, but are extremely volatile, so that the paste has to be made immediately before use. The preparation consists simply in grinding the onion or a portion of it after the dry leaves have been removed. The paste is then put into a glass dish with a diameter equal to that of the wound and is applied so that the paste does not come in contact with the wound, which is exposed only to the onion vapor.

Vaporization, as the treatment is called, is done for 10 minutes, usually in two five-minute intervals with a fresh onion paste each time.

At first the experiments were tried with 25 patients but lack of onions forced the doctors to limit themselves to 11 patients. Of these, seven had amputations of the arm, one of the thigh and three of the foot. Before treatment all the extremities showed distinct purulent inflammation, in some cases with a marked odor, as well as swelling of the soft tissues. Some patients complained of pains in the amputated areas.

After the first phytoncide treatment, the doctors report, all the wounds without exception became rose-colored instead of gray, and the patients no longer complained of pain. After the second treatment the pus condition subsided and the odor disappeared. After five days all the cases showed extensive soft epithelialization.

Positive results, with growth of new tissue and wound healing, did not occur in all patients. However, the Soviet scientists seem to feel that phytoncides have a place in treatment of infected wounds along with synthetic preparations such as the sulfa drugs.

They call attention to reports of other scientists that the juices of oranges, tomatoes and coniferous plants have a healing effect on wounds. These reports have attributed the healing effects to the vitamin content of the juices. The Soviet scientists believe it is more likely due to the phytoncides in the juices.

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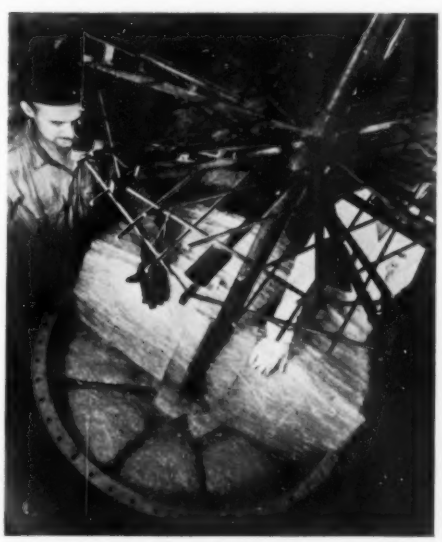
CHEMISTRY

Glass Fibers Very Strong In Proportion to Weight

➤ GLASS FIBERS are stronger in proportion to their weight than any known metal or alloy. Their tensile strength exceeds 250,000 pounds per square inch for the finer fibers. A wartime development is the use of these fine fibers as reinforcement for plastics to produce a structural material possessing hitherto unobtainable strength in proportion to weight.



***VERSATILE** — Another use for glass, in the form of fibers 85/10,000 of an inch in diameter, is in the production of alcohol as packing for distillation columns, replacing critical materials. The picture shows the packing process at the Tom Moore Distillery, Bardstown, Ky. The glass fibers used are manufactured by the Owens-Corning Fiberglas Corporation.*

Glass fibers will melt, but they will not burn. They will not absorb moisture. They will not stretch, swell or shrink, and are unaffected by most chemicals. They offer low resistance to the flow of vapors.

Extremely fine fibers are twisted and plied into yarns which are used to weave fabrics that must withstand heat, damp and decay. Somewhat larger fibers, treated with a binder, are fabricated into blankets and boards used for heat and sound insulation. Or, treated with a binder and pressed into wafer-like sheets, they are used as retainer mats in storage batteries to give them longer life. The coarse fibers, coated with an adhesive, are used to filter dust and pollen from the air circulated by air-conditioning and heating systems.

Processes of manufacturing Fiberglas differ according to the type of fiber to be produced. The basic method, however, is to attenuate fine streams of molten glass as they flow from tiny holes in the melting furnace, drawing them out with a high-speed winder or with high-pressure jets of air or steam.

So that you can see and feel different types of Fiberglas, some soft as milkweed and others quite coarse, kits have been prepared by Science Service. The Glass Fiber Unit of THINGS of science can be secured by sending 50 cents to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. and asking for unit No. 40.

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METEOROLOGY

Long-Range Forecasting

Weather predictions far into the future are practicable from measurements of solar radiation changes, head of Smithsonian Institution declares.

➤ LONG-RANGE weather forecasting, based on accurately made measurements of variations in the radiant energy received by the earth from the sun, are now practicable, Dr. Charles G. Abbot, secretary of the Smithsonian Institution, declared in Washington in the Twelfth Arthur Lecture of the Institution.

Dr. Abbot told of successful trial forecasts made by himself during recent years. In one, made at the request of a colonel of engineers, he predicted that the rainfall in the Tennessee Valley during a given three-month period would be between 84% and 87% normal. As subsequently measured during the period covered, it was actually 87% normal.

On the basis of what appears to be a general tendency for the weather in a given locality to repeat itself about every 23 years, Dr. Abbot made what might be termed forecasts after the event for a number of American cities, and compared them with the records of actual weather. The fit between the curves for predicted and actual weather for Peoria, Ill., he considers especially good, and on the strength of this he has laid down a continuation of the prediction-curve to indicate what the weather should be there for the balance of 1944. This curve of the future shows 1943 ending with a severe drought, which is expected to continue until well into spring, and then break sharply with a return to normal rainfall for that locality.

Last year he undertook a forecast for Washington, D. C.: "In March, 1943, I informed the Chief of the Weather Bureau that on a certain list of dates the average daily precipitation would be higher than on the remaining dates of the year. On the basis of my calculations, the selected dates were expected to show 1.66 times the average rainfall of the nonselected dates. The actual ratio, for the 175 selected dates compared to 191 nonselected, was 1.58."

Finally, for the farther future, Dr. Abbot predicted that great droughts in the Northwest in the years 1975 and 2020 will result in serious lowering of the water level in the Great Lakes.

As background for so bold an undertaking as the forecasting of weather on the earth by a study of conditions on the sun, Dr. Abbot reminded his listeners of the sun's enormous power as a radiator of free energy. The 8,000-mile circle represented by the earth's diameter, at a range of 93,000,000 miles, is incessantly receiving from the sun the heat equivalent to a quarter of a quadrillion (250,000,000,000,000) horsepower.

But this radiation is not steady and unvarying. There are fluctuations in the rate of reception. Little is known of their causes, but Dr. Abbot has identified not less than 14 cycles, or rhythmic curves of ups and downs, which the instruments maintained in three different parts of the earth by the Smithsonian Institution have measured in solar radiation.

As one fairly direct cause of departure from the average, Dr. Abbot called attention to the way sunspots operate. Each sunspot pours out a great conical spray or jet of electrically charged particles, like a stream of minute bullets from a gigantic machine gun. These sweep in vast circles as the sun makes its 27-day revolutions on its axis. These streams of particles have a scattering effect on the light that strikes them, so that when one sweeps across the earth there may be a drop of from 1% to as much as 5% below normal in the day-

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to-day radiation received on the earth.

In conclusion, the speaker suggested the desirability of adding half-a-dozen more solar observatories to the three now maintained by the Smithsonian Institution.

"I think," he stated, "there is a great probability that if such additional solar stations were in operation they would furnish information of major value to meteorology. I believe that with the solar data that would then be available, and using the rich store of information regarding terrestrial factors now familiar to meteorologists, great progress would ensue. The neglect of solar variation, which seems to be a major factor in weather, cannot continue if meteorology is to progress as it should."

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OPTICS

Least Light We Can See

Two to six trillionths of the energy it takes a flea to jump the height of a man's ankle is involved in the minimum visible light-flash.

➤ THE SMALLEST amount of light capable of stimulating the retina of the human eye has been measured and calculated. It is between five and 14 quanta, Dr. Selig Hecht, professor of biophysics at Columbia University, stated in a lecture before the Temple University chapter of the Society of the Sigma XI, national science honor society.

Measurements of this least light that we can possibly see have been the subject of two years of very careful experiments in Dr. Hecht's laboratory, on the trained eyes of seven skilled observers. As actually measured, the "minimum flash" represented an energy expenditure of between two and six ten-billionths of an erg.

An erg is a well-known physical measure of energy: it is the small amount that is sufficient to lift a weight of one milligram one centimeter in height. Or, to put it in livelier terms, imagine a flea weighing ten milligrams jumping to the height of a man's ankle. That would represent the expenditure of 100 ergs. Two to six trillionths of the energy in such an imaginary flea-power jump is therefore involved in the minimum visible light-flash.

"These incredibly small amounts of energy represent between 58 and 148 quanta of light, and when they fall on the cornea of the eye, we can see them," Dr. Hecht told his audience. "This number of quanta falling on the cornea cannot represent the number which actually is employed in vision because about 4% of it is reflected at the cornea, about half of it is absorbed by the lens and other ocular media, and of the rest, about 80% passes right through the retina without being absorbed. If corrections are made for all these factors—all of them having been well established by separate measurements—the range of 58 to 148 quanta at the cornea becomes 5 to 14 quanta of light actually absorbed by the retina."

The structure of the retina, the speaker continued, is such that it is most probable that the stimuli involve the striking of one light-sensitive cell by each quantum. Further, it seems most probable that within each such cell the effect is produced by the impingement of the light-quantum on a single molecule of visual purple, the photosensitive substance that translates light from the physics of quantum measurement to the biochemistry of physiological sensation.

"Judging by the structure of the retina, the nature of light, and the chemistry of visual purple, it is hard to conceive of a biological system which could be more sensitive than this," Dr. Hecht remarked. "Certainly there are no physical systems which even approach it."

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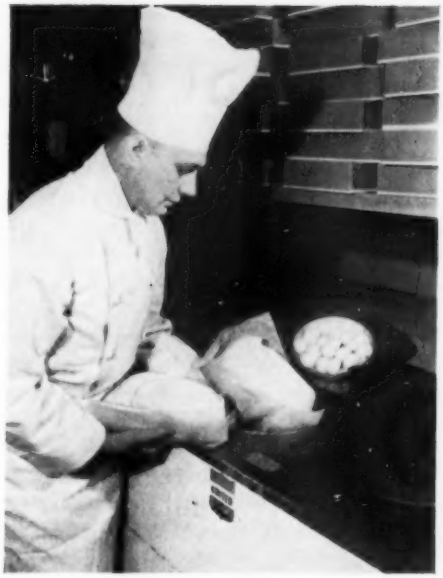
NUTRITION

Pastry Dough May Be Next On Frozen Foods List

➤ HOUSEWIVES of the future may bring home from the grocery store frozen, ready-to-bake pastry dough as well as frozen berries or other fruit for the pie for dinner, it appears from an announcement by United Air Lines.

Not that the air line company has entered the frozen food field, but Fred Raich, pastry cook in its Chicago flight commissary, has taken what may be the first step toward frozen pastry dough on the shelves of tomorrow's grocery stores.

At the time he joined United in 1938, Chef Raich, who came to this country from Austria in 1923, was vitally interested in the "retarded method" of keeping pastry dough overnight by placing it in temperatures ranging from 38 to 44 degrees above zero Fahrenheit.



ICE-BOX MIX—A sweet-roll dough, which can be stored for at least 90 days before baking if kept at temperatures between 12 and 16 degrees above zero Fahrenheit, has been developed by Fred Raich, shown in this picture, who is pastry cook in United Air Lines' Chicago flight commissary. Rolls made from this dough taste the same as those made from non-frozen mixes.

He experienced further with this "ice box dough." Doughs, with a high fat content, he discovered, could, when frozen, be kept in a perfect state of preservation for at least 90 days. As a result, much time can be saved, since he now makes up single, large batches of sweet roll dough instead of small quantities every other day. This dough, when baked, is said to taste the same as rolls from non-frozen dough.

Dough for bread or dinner rolls does not stand up quite as well under the freezing process, Mr. Raich explains, because it lacks sufficient fat to protect completely the wheat structure within the dough. This causes the necessary fermentation process to break down when such dough is baked.

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A *chestnut tree* near the foot of Mt. Etna in Sicily measures approximately 200 feet in circumference; this is the largest tree trunk measurement known.

GENERAL SCIENCE

Science Talent Institute

Thirty-eight boy and girl winners in Third Annual Science Talent Search, during honor-trip to Washington, are addressed by leading scientists.

See Front Cover

➤ THIS YEAR'S talented young scientists of America attended the five-day Science Talent Institute in Washington (March 3-7) as the culminating event of the Third Annual Science Talent Search for the Westinghouse science scholarships. This educational event is conducted by the Science Clubs of America, administered by Science Service.

This issue of SCIENCE NEWS LETTER reports some of the highlights of the sessions. The next issue will continue this report.

The picture on the cover of this SCIENCE NEWS LETTER shows Mrs. Franklin D. Roosevelt receiving the group of winners at the White House.

Dr. Henry C. Sherman, Chief, Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture:

The word "Nutrition" has at least two meanings. It means, on the one hand, a physiological condition of body; while, on the other hand, it means the providing of the body with nourishment. A properly comprehensive concept of the science of nutrition should of course embrace both of these meanings. Some of the trends in this science are:

First, to study more thoroughly the bodily condition of nutrition so as to obtain a more complete knowledge of the normal picture of nutritional condition and to develop more delicate and precise diagnostic methods for the detection of departures from the normal.

A second major trend in the development of this relatively new science of nutrition is toward the completion of our scientific acquaintance with the elements and substances which the body must have from without, and especially those which it receives through its food in order to provide for all the needs of the nutritional process as a whole. Probably what is first brought to mind when one hears the phrase "the newer knowledge of nutrition" is the discovery of vitamins. Within a relatively short time, as human progress goes or as compared with the histories of most sciences there have been a whole series of discoveries of substances generally called vitamins whose existence was previously either entirely unknown or only very vaguely apprehended. Most of these have now been carried through three phases of development of our scientific acquaintance with them: (a) the proof of existence, chiefly through observations of nutritional effects; (b) the actual isolation of the substance in the physical sense; and (c) its chemical identification, that is, the working out of its molecular structure.

And, certainly there is more still to be learned as to just which of the 92 chemical elements are needed in our nutrition. To a student of chemistry, it might well seem that no nutritional question could be more fundamental than this and that there is something a little topsy-turvy about research having expanded so far in other branches of nutrition without having completed its answer to such a fundamental question as this, relating to the chemical elements involved in the nutritional process. Further study, however, shows that this apparent unevenness in nutritional knowledge need not be a cause of undue anxiety, because such chemical elements as are still in doubt in this respect are needed, if at all, in such small quantities as practically always to be abundantly received by the body through its food and drink and the fine dust in the air that we breathe, so that there is no danger of such a shortage of any of these "doubtful trace elements" as would be a determining factor in body processes.

A third major trend is toward fuller study of the influence of nutrition upon the life process as a whole, both in the sense of the whole of the body and in the sense of the whole life cycle, even sometimes extending throughout successive generations of a family.

A fourth major trend in the science of nutrition is its extension into the food problems of whole communities or nations which has resulted in so great an awakening of nutrition consciousness under the conditions of the economic depression and of the world war.

LIGHTING OF TOMORROW—Dr. Samuel G. Hibben, Director of Applied Lighting, of the Westinghouse Electric & Manufacturing Company, is pictured showing the spectacular exhibit of the lighting of the future to a group of the winners of the Third Annual Science Talent Search. Left to right are shown: Patricia Ann Dunkel, Eleanor Jane Springer, Dr. Hibben, Joyce Mildred Marrison, Murray Gerstenhaber, Rodman Jenkins, Kenneth William Ford, Wayland Evan Noland, Wildon Fickett, Ben Roy Mottelson.

Dr. Bart J. Bok, Associate Professor of Astronomy, Harvard University:

It is unnecessary for survivors of a shipwreck, in a life boat or life raft, to let nature take its course and drift wherever the winds and waves happen to carry the boat. A simplified approximate kind of navigation can be practiced.

The navigator of a life boat is not expected to be able to fix the boat's position accurately to within one mile. With limited available navigational equipment, there is every reason, however, to expect him to know at all times the boat's position to within ten or fifteen miles. A skillful and ingenious navigator will find it possible to manage very well by a judicious blending of dead reckoning and celestial navigation.

When the order to abandon ship is given, there are four items to attend to:

1. Take, if at all possible, an emergency package containing a current Nautical Almanac, a booklet with some special tables for use in emergencies, a protractor, ruler, paper and pencil, and dividers, all placed in a water-proof package.

2. Make certain that you and several others have a watch which is running. The watch can either be set on Greenwich Civil Time, or on a local time differing by a known number of hours from Greenwich time.

3. Record the latitude and longitude of the ship when it is being abandoned.

4. If possible, place a sextant in the life boat.

The importance of knowing the location of the ship when it is being abandoned and having a watch that is running and knowing the zone time by which it is set, cannot be overstressed. With this information, it is possible to determine one's latitude and longitude fairly accurately.

The selection of an initial course is one of the most important ones of the entire voyage. The distance to the nearest mainland, or to an island or group of islands, should naturally be considered. But it is well to remember that it may be wiser to attempt reaching a shore a thousand miles away, in the direction in which the boat would normally be carried by wind and currents, than one only two hundred fifty miles away in the opposite direction.

Dr. Marshall H. Stone, Professor of Mathematics, Harvard University:

Mathematics is important for the young man or woman who is laying the foundations for a scientific career. For anyone who has begun with an interest in physics the important part played by mathematics in scientific thinking is already becoming plain. However, the first studies in biology or geology do not usually reveal to the young scientist that his interests, if followed up, may lead him into situations where mathematics of a fairly high order may be essential to his understanding and progress.

It may safely be said that all the various branches of science do tend to become more mathematical and that, accordingly, the inclusion of sound mathematical training, embracing analytic geometry, the calculus, and statistics, in the basic program of preparation is likely to prove of inestimable value to the young scientist. The wisdom of obtaining such preparation in the earlier stages of scientific study lies in the often observed fact that the acquisition of basic mathematical knowledge at the time when it is most urgently needed by the investigator in his later career is extremely difficult if not practically impossible. Of course, the physicist, physical chemist, and engineer will in most cases desire a more extensive mathematical preparation than that described above.

Those who hope to open new frontiers in the "exact sciences" will indeed probably need all the mathematics they can work into their programs of study. As for those whose interests are already in mathematics itself, they will find that their studies open up a wealth of new concepts, and new problems, which they can hardly begin to imagine in the first year or two of college study.

Dr. E. U. Condon, Associate Director, Westinghouse Research Laboratories:

Progress in the study of atomic physics stopped in America about three and a half years ago when it became necessary for the physicists of the country to turn to development of new instruments of war. Work in basic science came essentially to a standstill somewhat earlier in Europe—first in Germany, then in the other nations as they belatedly recognized the sinister intentions of the Nazis.

It is especially important to make the point that physical science stagnates during war, because the contrary view is so often maintained by persons who do not distinguish between real scientific progress and the mere extension of the use of science for specific applications. During war time a great deal of progress is made in application of science to military jobs. But this is done under such pressure to get a specific result quickly that there is considered to be no time for the study of the basic problems of science. During war we run on our scientific capital. We exploit in every way all the science we know and, hating war as we do, we bend every effort to get it finished. We do this with an intensity which even fails to provide adequately for the training of the next generation of scientific workers. Such a policy is justifiable in a society which looks upon war with abhorrence—which wants to get a bad job over with quickly.

When the shooting is over then the biggest problem confronting us will be the establishment of a world society in which there will be the fullest incentives and opportunities for developing the best conditions of life for everyone. For us, who are particularly interested in science this means a world in which there will be liberal support for and appreciation of scientific research as an element of basic culture and as the source of the engineering progress of the future. We must not expect that this problem of the post-war world will necessarily be solved in a good way. It will require the best efforts of all of us to reorganize the messed-up world which we will inherit.

About the only thing we can be sure of is that there will be very great changes in the social, economic and political structure of the world from the forms with which we were familiar in the pre-war world. If we are to progress these new forms will be marked by a greater cooperativeness and mutual understanding both as between different groups in each country and as between the different peoples of the earth.

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ENGINEERING

"Thinking" Valve Used To Control Temperature

➤ FOR TEMPERATURE controls in larger structures, such as hotels and office buildings, Dr. Willis H. Carrier, executive head of the well-known engineering firm that bears his name, offers what has been nicknamed a "thinking" valve, which is protected by patent No. 2,342,328.

Temperature control in such large buildings is usually effected by two distinct systems of circulating coils, one for cold, the other for heat. Hitherto each of these systems has required its separate control valve and thermostat set-up. By making a single valve responsible for the control of both heating and cooling coils, Dr. Carrier's invention decreases both complexity and cost.

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PSYCHOLOGY

Experts Will Give Advice On Employing Veterans

➤ EMPLOYERS who want to give jobs to men returning from the armed forces with physical disabilities will be able to obtain the advice of experts on how to place these men so that they will not be handicapped. The formation of a panel of authorities to furnish practical data to industry was announced by the Industrial Hygiene Foundation of Pittsburgh.

The panel is prepared to function until the job of rehabilitation is done, and employers are encouraged to send in questions to be answered by the five experts on the panel.

Members of the panel are: Dr. C. D. Selby, medical consultant, General Motors Corporation, Detroit; Col. John H. Andrews, executive officer, Re-employment Division, National Selective Service System, Washington; Dr. Harley L. Krieger, medical director, Ford Motor Company, Detroit; A. A. Hendrix, personnel director, Eastern Aircraft Division, General Motors Corporation, Linden, N. J., and I. Dent Jenkins, personnel manager, Harrison Radiator Division, General Motors Corporation, Lockport, N. Y.

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PSYCHIATRY

Reasons Why Mentally-Ill Should Go to Hospital

➤ EVEN if a doctor advises it, the relatives of a mentally sick person are usually very reluctant to take the patient to a hospital for mental sickness. They forget that these institutions are hospitals, places where sick people go to be taken care of and helped to get well. Five good reasons why the mentally sick person may be better off in a hospital than at home are given by Edith M. Stern in her book, *Mental Illness: A Guide for the Family*. (Commonwealth Fund, $1.) Much other helpful information is given in this same book.

First, the author points out, conditions at home often cause or aggravate mental illness. The devotion and solicitude shown by members of the family may be too great, or there may be more friction than the patient can stand. In the hospital he gets an "emotional breathing spell."

Second, the hospital has all the facilities and the trained staff needed to help the patient recover.

Third, besides giving the patient an emotional breathing spell, the hospital also provides a place where the patient under emotional strain may "blow off freely," without disturbing relatives or neighbors and without having to put up later with their irritation or scorn or other feelings about the outburst.

Fourth, the patient benefits through group suggestion. The untidy patient seeing others keeping themselves and their belongings clean and in order is likely to fall in line and do the same, although he is apparently immune to nagging and scolding about such things at home. A restless patient who sees everyone else going to bed at a certain hour goes to bed himself. He sees the others sitting down to eat at regular meal times, so he does the same.

Fifth and very important reason for taking mentally sick patients to mental hospitals is for their own safety. Mentally sick persons may seriously injure themselves or commit suicide. No untrained person, however devoted and watchful can possibly foresee and forestall all such attempts.

Science News Letter, March 11, 1944

ENGINEERING

Streamlined Trains For Interurban Traffic

➤ COMMUTERS in the post-war period are promised trimmer trains to ride on, by a design on which U. S. patent 2,342,724 has just been issued, to A. H. Candee of Pittsburgh. More space for passengers, better distribution of weight and more flexible control are among the advantages claimed.

Each unit comes in three articulated sections, with a four-wheeled truck under each section. Passenger space is located in the end thirds, together with an operator's compartment at either end. The center section is occupied by the power unit, consisting of an internal combustion engine direct-connected to an electric generator. The passenger sections are connected by a corridor running along one side of the power compartment. One special advantage of the new unit lies in the detachability of the power unit. Engine, generator and control panel can be lifted together out of the center section and a spare power package inserted, thus enabling the car to remain in service during repairs or overhaul of the power machinery.

Rights in the patent are assigned to the Westinghouse Electric & Manufacturing Company.

Science News Letter, March 11, 1944

IN SCIEN

RADIO

Television Theaters After War Predicted

➤ OPENING of several hundred television theaters in the first ten years after the war was predicted by Ralph R. Beal of the Radio Corporation of America, speaking at a meeting of the San Francisco Engineering Council. Television images of events as they occur will be shown on screens up to some 15 by 20 feet. The theaters will be connected into national television networks, he said.

Home television sets, until now confined to 9 by 12 inch screens, will produce much larger and brighter pictures after the war, he declared. Pictures up to 18 by 24 inches have been successfully produced experimentally.

Television broadcasting will use automatic, unattended radio relay stations spaced at intervals across the country. These radio towers, Mr. Beal explained, may be supplemented by specially designed wire circuits or coaxial cable. Television developments will reach enormous proportions when war uses are no longer first consideration.

Science News Letter, March 11, 1944

CHEMISTRY

Benzene Can Provide New Source for TNT Base

➤ A NEW SOURCE for toluene, raw material for TNT, is provided by a process on which patent No. 2,338,973 was issued to Dr. Louis Schmerling of Chicago. Initial material is benzene, produced in quantities both in distillation of coal to make coke and in petroleum refining. This is chemically "doubled up" to form a compound known as dibenzyl.

In Dr. Schmerling's process, dibenzyl and hydrogen are heated together under pressure and in the presence of a catalyst. A high percentage of the raw materials are converted into toluene. A coproduct is styrene, which is an ingredient of the principal kind of synthetic rubber now being manufactured in this country.

Rights in the patent are assigned to Universal Oil Products Company.

Science News Letter, March 11, 1944

NCE FIELDS

PHYSICS

Faint Rose Color in Sky Is Warning to Rangers

➤ FAINT PINK or rose color in the sky is a warning to tower men and rangers on the lookout for forest fires. It is a common practice for them to glance sunward frequently during the fire season in search of this faint coloring as it is often caused by small quantities of dissipating smoke and thus indicates fire in the not distant vicinity, or at least to windward.

In cases of severe forest fires this phenomenon is noticeable sometimes several hundred miles from the exact location of the fire. The color becomes somewhat browner as the smoke becomes denser, or the fire approaches nearer, Leavitt Baker, Jr., of San Anselmo, Calif., points out.

It is sometimes difficult to determine the difference between smoke and haze until the brownish color appears. This delicate coloring is frequently caused by industrial smoke or dust storms as well as by fire. (*See SNL,* Jan. 1)

Science News Letter, March 11, 1944

MEDICINE

Two More Infections Yield to Penicillin

➤ LATEST serious illness to yield to penicillin treatment is secondarily infected amebic abscess of the liver. Recovery of the patient after penicillin had been injected into the abscess is reported by Dr. Paul H. Noth and Dr. John Winslow Hirshfeld of Wayne University College of Medicine, Detroit, in the *Journal of the American Medical Association.* (March 4)

This issue of the medical journal might be called the penicillin number, since the bulk of the reports are on this subject.

Cures of usually fatal brain infections in three patients treated with penicillin at Lawson General Hospital are reported by Capt. Albert L. Evans, M.C., A.U.S. Staphylococcus germs were responsible for the meningitis in two cases and pneumonia germs in the third.

Need for more knowledge of how the mold chemical achieves its cures and of the best methods and doses for use in treating patients is stressed in reports by Dr. Martin Henry Dawson and Dr. Gladys L. Hobby, of New York; Dr. Wallace E. Herrell of the Mayo Clinic; Dr. Arthur L. Bloomfield, Dr. Lowell A. Rantz and Dr. William M. M. Kirby, of San Francisco; Dr. Rene J. Dubos, of Boston; and in discussion of these reports by Dr. Chester S. Keefer, of Boston, and Dr. Walter S. Priest, of Chicago.

"The most urgent problem," Dr. Dubos states and Dr. Keefer reiterates, "is not the discovery of more and more antiseptics, but the definition of that property or more likely combination of properties which determine whether a certain agent will retain its antimicrobial activity in the presence of animal tissues without injury to the latter."

More complete understanding of this problem, it is pointed out, will not only help in the search for new chemical remedies like penicillin, gramicidin and the sulfa drugs, but also in the rational use of those already available.

Science News Letter, March 11, 1944

MEDICINE

Tropical Medicine Expert Gets Medal of Palladium

➤ A MEDAL of palladium, rarer metal than platinum or gold but not a war emergency material, was presented in New York to Col. Richard Pearson Strong, director of tropical medicine at the Army Medical School, Washington.

The medal, for distinguished service in tropical medicine, with an honorarium of $500, was awarded by the American Foundation for Tropical Medicine. Known as the Richard Pearson Strong medal, it was awarded for the first time and will be awarded periodically hereafter. It was established as a result of a gift to the Foundation from the Winthrop Chemical Company.

Science News Letter, March 11, 1944

PHYSICS

Supervoltage X-Ray Tube Produces "Hard" Rays

➤ A SUPERVOLTAGE X-ray tube, designed to produce very "hard" rays of short wavelength has been given patent 2,342,789, obtained by Benedict Cassen of Pittsburgh. One feature claimed by the inventor is the freedom from necessity for high-voltage insulating and protective equipment, which make many super-X-ray machines so cumbersome.

Rights in the patent are assigned to the Westinghouse Electric & Manufacturing Company.

Science News Letter, March 11, 1944

PSYCHIATRY

"Neurotic" Cats Serve As Guinea Pigs In Test

➤ CATS made "neurotic" by inner conflict between hunger and fear served as guinea pigs in experiments designed to investigate possible reasons for the use of morphine by human addicts, many of whom suffer from psychoneuroses.

The experiments were conducted by Dr. A. Wikler of the U. S. Public Health Service Hospital at Lexington, Ky., and Dr. J. H. Masserman of the University of Chicago. (*Archives of Neurology and Psychiatry*) Doses of about one milligram per kilogram of body weight were found to be effective.

In all the animals, the drug affected strongly the patterns of behavior which had previously been learned by the cats. The more recently learned patterns disappeared first and reappeared last as the effects of the drug wore off.

This is interesting because it might indicate that this drug is capable of breaking up recently acquired "abnormal" ways of behaving while not disturbing (or disturbing less) the older, more "normal" ways of life.

In three out of the five cats treated, the "neurotic" behavior was back again in full force when the morphine had entirely worn off.

Science News Letter, March 11, 1944

CHEMISTRY

New Packaging Material Has Plastic Resin Base

➤ A NEW plastic packaging material, suitable for moisture-proofing war equipment, food and other articles, has been developed in the laboratories of the Goodyear Tire and Rubber Company and is now being made on a limited scale in a pilot plant. It has been named V-Film and will replace in part an older material known as Pliofilm which requires some natural rubber. The entire supply of Pliofilm is now used for protecting warplane engines in transit.

The new material uses a base of plastic resin. It is made with a derivative of polyvinyl chloride. It is not a substitute for the older material which is made with a rubber hydrochloride base, but is a supplementary material suitable not only for packaging but for fabrication into materials for raincoats, shower curtains, umbrellas and other articles where stitching and sewing are required.

Science News Letter, March 11, 1944

CHEMISTRY

Mr. Saunders' Magic Glue

"Gunk" that will stick anything to anything else will hold strips of aluminum alloy together until a pull of more than a ton and a half forces them apart.

By HARLAND MANCHESTER

➤ EVER SINCE man began inventing things, one of his quests has been an all-purpose glue that would bond all kinds of materials in an unbreakable union, a glue stronger than rivets, screws or bolts. He has even dreamed of a glue that would stick together a house, a plane or an automobile body, with fabulous savings in time, trouble and material.

I thought this was just a visionary idea when I walked into the Chrysler Corporation production research laboratory of S. Gordon Saunders in Detroit recently. Saunders, a casual, good-natured man in his forties, said he had some "gunk" to show me.

He produced a can of what looked like ordinary glue, smeared two large pieces of sheet iron with it, and stuck them together. He squeezed them for a few minutes in an electrically-heated clamp. Then a brawny, six-foot mechanic took a cold chisel and a hammer, secured one part of the united chunk in a vise, and tried to knock off the other part. He worked until the sweat ran but made no impression whatever.

Mr. Saunders showed me the overlapping ends of two slender strips of aluminum alloy that had been stuck together with the same glue. The joined strip was placed in a stretching machine used for testing. Mr. Saunders turned a crank, and an indicator moved slowly around a dial, showing the number of pounds of pull applied. The hand passed the 1,000 and the 2,000-pound marks and nothing happened. When the needle reached 3,100—a pull of more than a ton and a half—the two strips grudgingly separated.

This sensational glue is no mere laboratory sideshow. They call it Cycleweld, and during the last year it has gone to work for 50 war production companies, saving man-hours and materials in hundreds of ways. In bombers, fighting planes and gliders the magic glue has reduced the number of rivets by thousands. Cycleweld has been introduced in automobile manufacture. It is being used in making electrical instruments and all manner of small mechanical devices.

This new glue not only unites metal to metal, but will stick metal to wood or to plastics, glass, fiber board, natural rubber and most synthetics—and will quickly and permanently bind any of these materials together in any combination whatever. While it is possible to break the union by means of powerful laboratory testing equipment, no Cycleweld bond has ever yet cracked in regular duty, or has relaxed its hold because of vibration.

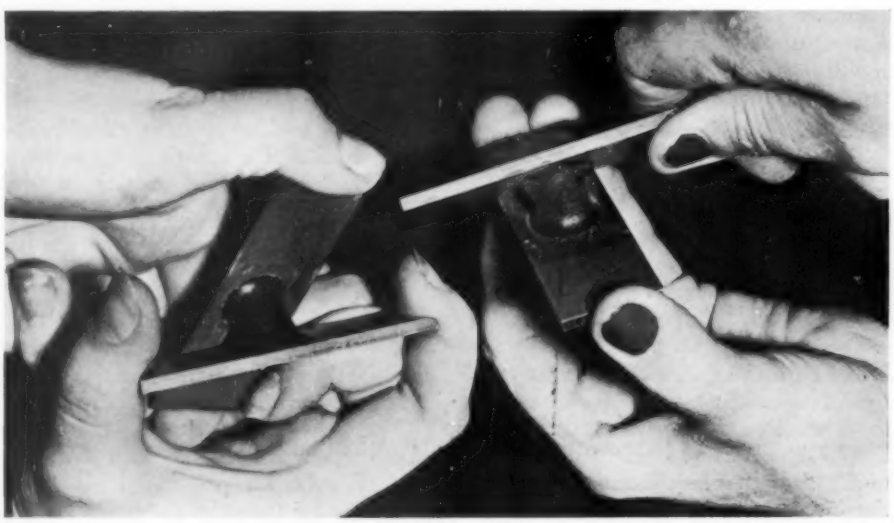
Vibration Resistance

This resistance to vibration has made the glue invaluable in airplane construction. I saw metal wing flaps for P-40 fighter planes being glued together in 18 minutes, saving four man-hours' riveting time. These wing flaps are crisscrossed with interior supports to make them rigid under the terrific strains of combat. Once it took 1,200 rivets to hold the supports in place. Now the super-glue is applied with a spray gun along the strips where the supports are to be placed, and the assembled flap is squeezed together in a heated press, eliminating 900 rivets and cutting the cost by one third. "Look at this aircraft stabilizer," Mr. Saunders said to me. "Only a few months ago 5,500 rivets were used in assembling it. Now we use only 30, and do the rest of the joining by Cyclewelding. The wing is just as strong as the old one, or stronger. This process costs only one-tenth as much as riveting."

Discovered 5 Years Ago

It was only five years ago that Mr. Saunders discovered the formula for Cycleweld. A synthetic resin, it belongs in the same broad group of chemical compounds from which plastic ashtrays, telephone receivers and bomber noses are made, although the exact combination which produced this adhesive is, of course, a secret.

Saunders, a chemical engineer from the University of Kansas, came to the Chrysler Corporation as an expert in paint and synthetic resins. He got started on the work (*Turn to page 172*)



EARLY STEP—In the beginning of his research to find a super-glue, Mr. Saunders discovered that these round "tension buttons" of rubber could be bonded, with his thermosetting plastic, so firmly to pieces of laminated phenolic plastics that the rubber would tear before the bond gave way. The glue gave better results at low temperature, and experiments were continued in this direction.

America's NEW Frontier

• IN AMERICA'S EARLY DAYS of growth, opportunities for progress lay in the ever widening frontiers. In the fertile lands of the great plains . . . in the timber of our forests . . . in the metal of our mines.

Today, we have reached the limit of our physical frontiers. But new frontiers lie before us—new opportunities for exploration—in our research laboratories. Here in the multiple world of the electron tube are being born the scientific advances that will make our world immeasurably safer and happier.

Pioneering on this new frontier of research are RCA Laboratories in Princeton, New Jersey. Today RCA Laboratories are devoted to providing the fighting forces of the United Nations with the best radio and electronic equipment available. Tomorrow, this same skill will continue to serve America in creating new and finer peacetime products.

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Do You Know?

Man is the only animal with a jutting chin.

Most snakes are nocturnal and prefer to do their hunting at night.

United States *war expenditures* during 1943 averaged about $241,000,000 a day.

Nearly 99% of the *calcium* and 70% of the phosphorus in the human body are in the bones and teeth.

In 1941, *cheese* made in factories in the United States totaled nearly 1,000,000,000 pounds, about half of which was made in Wisconsin.

A 24-inch pipeline from Texas to the East, now under construction, will deliver approximately 200,000,000 cubic feet of *natural gas* daily by next fall.

Persons 65 years of age and over constituted 4.3% of the *population* of the United States in 1900, and 6.8% in 1940; the under-20 group decreased from 44.3% to 34.5%.

Paints that reflect infra-red rays may be used on houses after the war; they reduce heat absorption in the painted surface, thus keeping the building cooler in sunlight.

Twenty-one new *blast furnaces* have been constructed by the steel industry in the United States since Pearl Harbor; their combined capacity is about 8,000,000 tons annually.

Alaska lies in the same latitude as Sweden, Norway, and Finland; it exceeds in size the combined areas of these three countries which have a combined population of more than 12,000,000 people.

Ground *pork or beef* which is to be frozen for preservation should not be salted, as salt stimulates oxidation resulting in rancidity; sage, pepper, mace, and ginger seem to have an opposite effect.

Vicuna wool is from a hardy gazelle-like little animal, two feet high, which lives in the high Andes in Bolivia and Peru; the vicuna is related to the camel, and its wool is probably the softest of all animal fibers.

From Page 170

which led to his new adhesive when someone at a conference asked, "What makes paint stick to metal?" It occurred to him that it would take tremendous power to pull off a single square inch of the paint on the surface of an automobile. Why not learn what makes this happen, and use the knowledge in creating a new super-glue?

In the fall of 1942, Cycleweld was demonstrated in Detroit before 200 representatives of the aircraft industry. The plane builders were greatly impressed. Soon they, as well as the Army Air Forces Matériel Command at Wright Field and the Navy Bureau of Aeronautics at Philadelphia, were backing the adaptation of the process to warplanes.

If the magic glue is revolutionizing the metal plane, its future in plywood aircraft is breath-taking. Saunders foresees a Cycleweld-engineered fighter plane, using unprecedented amounts of plywood at about one-third the weight, one-fourth the cost and one-fourth the production time of a comparable all-metal plane.

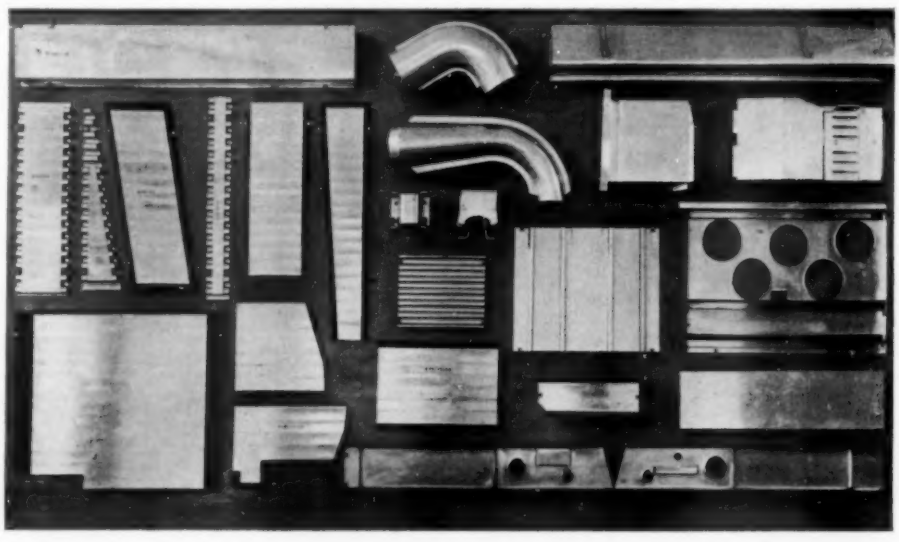
The major handicap of modern plywood is the difficulty of fastening it firmly to other parts. Saunders showed me how Cycleweld solves this problem. Two sheets of plywood simply bolted together were yanked apart in a testing machine with a pull of only 190 pounds, the bolt tearing out a slender piece of the wood. When Cycleweld was used, the strength was increased about 500 per cent.

New horizons in housing are also in sight because of this process which makes possible the joining of all manner of building materials. Already floor panels made by Cyclewelding corrugated steel within thin layers of plywood are being made for use in prefabricated houses. About as thick as ordinary flooring, it is lighter and stronger, and so rigid that only half the normal number of joists are needed.

Another of Saunders' exhibits is a wooden block a foot square made up of multiple layers of plywood. The layers have been sprayed with Cycleweld and bonded by passing heat-producing radio waves through them. Since the layers were placed with the grain of the wood alternating, a beam or support made in this manner has many times the strength of solid wood, and is, in fact, as strong as steel. This is a new entry in the post-war construction race.

Cycleweld's first job after emerging from the laboratory was to bond insulating material to the steel roofs of automobiles, but many other automotive tasks await it. In fact, the new adhesive may change the whole appearance of tomorrow's car, reducing the thickness of corner posts and other supports and bringing about a lighter, stronger, more streamlined body.

At last there may be a transparent plastic top, something technical men



GUNKED—Mr. Saunders' Cycleweld bonds together all these parts for medium bombers. Floor sections used in the bombers are Cyclewelded together in a metal-to-metal bond—one of the ways the new cement saves many man-hours.

have scoffed at as impractical because vibration would break the joints holding the top to its supports. Now the top can be attached by Cyclewelding a thin rubber sandwiched between the plastic and the metal.

That is only a beginning, Saunders says. When you find a gunk that will stick anything to anything else, the sky is the limit.

For much of the technical data in this article the author gratefully acknowledges indebtedness to Lloyd Stouffer, author of "Cycleweld—a New Bonding Process," published by *Modern Plastics*, September, 1943.

Science News Letter, March 11, 1944

CHEMISTRY

Paper Shipping Sacks Receive Specifications

➤ THE FIRST extensive federal specifications for paper shipping sacks have just been issued by the National Bureau of Standards. War uses of paper sacks, now necessarily replacing metal, wood or textile containers, make these of particular importance at the present time.

Specifications include construction details for five types of sacks, and for waterproofing the ends of sewn sacks. They cover four different kinds of kraft paper: shipping sack paper, paper treated for high wet strength, paraffined paper, and asphalted paper. For wet-strength paper a wet tensile strength of about 27.5% of the dry strength is specified.

Science News Letter, March 11, 1944

CHEMISTRY

Process for Obtaining Magnesium from Sea Water

➤ MAGNESIUM, super-light metal needed alike for airplane construction and illuminating flares, has been obtained in quantity from sea water during the present war. Patent 2,342,666, on a process for doing this, has been granted to S. B. Heath and F. R. Minger of Midland, Mich., and assigned by them to the Dow Chemical Company. Basic steps in the process are the treatment of the sea water first with a lime slurry, then with calcium chloride, to remove undesired compounds (principally sulfates), and introducing carbon dioxide to unite with the magnesium to form magnesium chloride. Since this compound is highly soluble, it remains in solution while the insoluble sulfates are precipitated and filtered out. Then the magnesium chloride is reduced to solid form by evaporation.

Science News Letter, March 11, 1944

CHEMISTRY

Oil-Treated Shoe Soles

➤ SOLES of wartime rationed shoes last longer if treated before attached with special oil preparations, or impregnated with wax. In tests made during the past year by the National Bureau of Standards, an improvement was found of 14% in wear of sole leather of grades available to civilians, and a possible improvement of from 30% to 40% indicated by a few service tests of wax-impregnated soles.

Some thirty commercial mixtures for water-proofing and improving wear were examined at the Bureau, but the service tests on oil-treated soles were confined to two, both of which are made of available materials and may be applied without special equipment. In the service tests a considerable number of cadets were used, the cadets being in a Washington, D. C., high school military unit.

OFFICIAL U. S. NAVY PHOTOGRAPH

BINOCULARS LIKE THIS MUST PASS

a "swimming" test

Bausch & Lomb 7X, 50mm Binocular

Bausch & Lomb developed the first waterproof binocular—a binocular which can be immersed in a tank of water, yet due to its water-tight construction, not a drop of water can get into the interior to fog the optics or interfere with its perfect functioning.

This engineering achievement required a complete redesign of the instrument, complete re-tooling and revised manufacturing procedure. All this was accomplished without interrupting the scheduled even flow of needed binoculars to the armed forces.

Based on this redesign, both the Army and Navy now specify that *all* binoculars supplied to them be of waterproof construction.

Facilities of this plant — developed through 90 years of service to outdoor enthusiasts, to science and industry—are busy today fighting a war. After Victory new miracles of optical science for better living will come from the drafting tables, the glass furnaces and the precision finishing rooms of Bausch & Lomb, optical headquarters of America.

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For them special shoes were made to their individual measurements.

Each pair of shoes for the cadets had a treated sole on one and an untreated sole on the other. In half the cases the treated sole was for the right foot, in the other half for the left. Oil-treated half-soles for repairs were prepared and held in reserve until a hole appeared in a sole. Then the pair were re-soled, the treated half-sole being put on the shoe which had the untreated original sole. This was done to give "balanced" tests.

The preparations used in the tests were mixtures of mineral oils and a solvent. The soles were put in the solutions long enough to become well filled with the preparation, then they were dried at room temperature. They gained from 10% to 12% in weight, and lost very slightly in thickness. Commercially, the treatment should not cost over two cents a pair. No difficulties were experienced in fabricating the shoes because of the oil treatment. The repairs were made in an ordinary shoe repair shop.

The treatment of leather soles on shoes in the home by this method is not recommended by the Bureau as complete immersion of the sole is not practical when it is attached to the shoe. The commercial treatment, the Bureau says, "appears to be effective, inexpensive and practical, and it would seem desirable that such treatments should be generally adopted in the industry."

The wax-impregnation method is more costly because of special heating and other equipment required.

A recent progress report of the U. S. Interdepartmental Committee on Leather indicates a way in which oil or wax-treated soles may be used in so-called "cement constructed shoes," or shoes to which the soles are attached by cement rather than by sewing. In the process recommended the section of the outsole which is to be cemented is roughened and pyroxylin applied before the sole is dipped in the oil mixture or wax.

Science News Letter, March 11, 1944

CHEMISTRY

Plywood Bathtubs

➤ WOOD, the "Sleeping Beauty" of materials, is beginning to awaken.

Bathtubs of molded plywood, wood floors which can be cut from rolls, fireproofed wood structures 17 stories high, bakers' yeast, anti-freeze and photographic developers are only a few of the products we may expect from wood in the post-war world, according to Prof. Robert W. Hess of Yale University in an article in *Tropical Woods,* technical publication of the Yale school of forestry.

And wood, unlike metals, coal, oil and other exhaustible natural resources can, he said, be continuously supplied from lands unneeded for other purposes.

Until recently, Prof. Hess pointed out, all progress in the wood industry has been in the methods of maufacture, while the product has remained the same: lumber. Now, he said, new discoveries are promising a material of varied personality and uses.

Already plywoods, synthetic resin adhesives and resin impregnation to improve the properties of various woods have been developed, forecasting a change in the conventional picture of wood and the use of many species of woods not previously utilized. Resin-impregnated woods, which do not swell or shrink, Prof. Hess said, can even be used for gears and bearings.

Science News Letter, March 11, 1944

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ZOOLOGY

NATURE RAMBLINGS by Frank Thone

No Gentleman

➤ FINE FEATHERS do not make fine birds, we are assured in one of the most familiar of old adages. The same might be said with ditto marks, about fur and mammals. Among the most prized of all furs is wolverene—that is, except when the beast himself is still wearing the pelt.

The wolverene is just about the "orneriest" of all quadrupeds. Trappers hate him because he steals bait, also because he tears up and partly eats other trapped animals. And he is so cunning that he almost never steps into a trap himself.

He is such a greedy feeder that he has well earned that alias of "glutton," and after he has stuffed himself he befouls whatever is left so that no one else would want it.

The wolverene is practically extinct in the United States. Nobody seems to regret it much.

Science News Letter, March 11, 1944

INVENTION

Illuminated Target For Anti-Aircraft Fire

➤ FOR THE TRAINING of night-fighter pilots and for anti-aircraft gunners on the ground or surface ships, A. D. Dircksen, of Dayton, Ohio, has invented an illuminated target to be towed through the air by a plane. It consists of several tubular cloth sleeves, with a strong, battery-powered electric lamp suspended in the center of the frame at the forward end. This eliminates the use of searchlights from the ground, or of a long, power-eating electric cable from the towing plane, hitherto in use.

Rights in patent 2,342,651, covering this invention, are assigned, royalty-free, to the government.

Science News Letter, March 11, 1944

Books of the Week

► EXPLOSIVES have a fascination for chemists: witness boys disrupting the good order of practically every high-school laboratory; the endless, risky, smoky experiments of old-time alchemists. Interested audiences are therefore assured, even outside the professional circles for which it is primarily intended, for the LABORATORY MANUAL OF EXPLOSIVE CHEMISTRY, by Allen L. Olsen and John W. Greene (*Wiley*, $1.75).

Science News Letter, March 11, 1944

► AN EXCELLENT addition to the literature in the field of state and regional floras is Cecil Billington's SHRUBS OF MICHIGAN, published by the *Cranbrook Institute of Science* ($2.50). Michigan's great diversity of climatic and edaphic conditions is reflected in the diversity and wealth of her vegetation; this book will thus be useful far outside the state boundaries.

Science News Letter, March 11, 1944

► MOST recent books on the world's food supply are anxiously concerned primarily with the present emergency; many of them give partisan support to one theory or another, hence tend to become somewhat excited and shrill. In FOOD, WAR AND THE FUTURE (*Harper's*, $2.50), however, E. Parmalee Prentice takes a wider, more philosophic viewpoint, looks back over a longer historical perspective, and speaks more reassuringly at the end. He is a bit perturbed by the Malthusian specter, but believes that even it can be exorcised.

Science News Letter, March 11, 1944

Just Off the Press

AERODYNAMICS OF THE AEROPLANE—W. L. Crowley—*Ronald*, 201 p., illus., $2.25.

BASIC RADIO—C. L. Boltz—*Ronald*, 272 p., illus., $2.25.

THE CHEMISTRY OF SYNTHETIC SUBSTANCES—Emil Dreher—*Phil. Library*, 103 p., $3.00. The author offers the book as an introduction to acquaintance with the chemical processes taking place in the production of synthetic substances.

EDUCATIONAL YEARBOOK OF THE INTERNATIONAL INSTITUTE OF TEACHERS COLLEGE, COLUMBIA UNIVERSITY 1943—I. L. Kandel, ed.—*Columbia Univ.*, 297 p., $3.70.

ENCYCLOPEDIA OF CHILD GUIDANCE—Ralph B. Winn, ed.—*Phil. Library*, 456 p., $7.50. A large number of contributors discuss a variety of parents' problems from ability and acceleration to war effects, weaning and wishful thinking.

FUNDAMENTALS OF RADIO COMMUNICATIONS—Austin R. Frey—*Longmans, Green*, 393 p., illus., $4.00.

MEDICAL CARE OF THE DISCHARGED HOSPITAL PATIENT—Frode Jensen, H. G. Weiskotten, Margaret A. Thomas—*Commonwealth Fund*, 94 p., $1.00.

METEOROLOGY: THEORETICAL AND APPLIED—E. Wendell Hewson and Richmond W. Longley—*Wiley*, 468 p., illus. $4.75.

MODERN DRAFTING—William H. Johnson and Louis V. Newkirk—*Macmillan*, 197 p. illus., $2.50.

NEWS OF THE NATION: A Newspaper History of the United States—Sylvan Hoffman, ed.—*Garden City*, 164 p., illus., $3.49, paper.

A PICTORIAL GUIDE TO MANY LANDS: The British Commonwealth and Empire—W. J. Turner, ed.—*Hastings*, 312 p., illus., $5.

THE SKULL OF SINANTHROPUS PEKINENSIS: A Comparative Study on a Primitive Hominid Skull—Franz Weidenreich—(Geological Survey of China) *Stechert*, 485 p. illus., $10, paper.

SURGERY THROUGH THE AGES: A Pictorial Chronical—Lejaren 'A. Hiller—Text by Paul Benton and John H. Hewlett—*Hastings*, 176 p., illus., $3.50.

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⚙ *BREAKFAST cereals are furnished soldiers overseas in specially treated packages that may be used as bowls. The soldier tears the top off, adds sugar and milk, and eats right out of the box.*

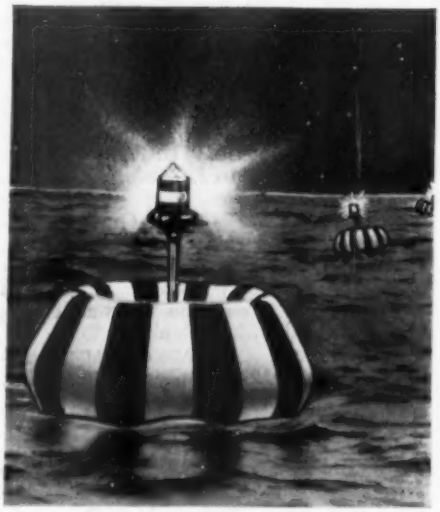
Science News Letter, March 11, 1944

⚙ *COOKING by wireless is successfully done on a demonstration stove by magnetic waves, radiating from the cold range top, which induce currents of thousands of amperes in the metal of the cooking utensil. These currents quickly heat utensil and food. The magnetic waves cook faster and more economically than usual resistance-heating elements.*

Science News Letter, March 11, 1944

⚙ *A TELEVISION antenna, which can be used also for cooling the house in hot weather and for fire prevention, has been granted a patent. Acting as a sprinkler system, it consists of a thin-walled metal tubing paralleling the ridge of the house, perforated with many small openings through which water can be ejected. In dry atmospheric conditions a little water in the tubing improves reception, it is claimed.*

Science News Letter, March 11, 1944



⚙ *DOUGHNUT-SHAPED rubber buoys, with green and gold lights, a standard to hold the lights aloft, and a storage battery container, are used to mark safe places for flying boats to light on the water. The buoys toss on a rough sea but the lights remain stationary. The lights are visible for three miles on the surface and from 4,000 feet in the air. Several are shown in the picture.*

Science News Letter, March 11, 1944

⚙ *A KNIFE with a built-in sharpener, recently patented, has a hollow handle with open sides into which the blade may be drawn by pulling its shank out to the rear. The cutting edge of the blade then passes between the wheels of a small rotary sharpener of the kitchen type which, when not being used otherwise, holds the shank firmly in place.*

Science News Letter, March 11, 1944

⚙ *ULTRAVIOLET irradiators, recently developed to give vitamin D rays to groups of persons, use a new, high-pressure, quartz mercury, arc-type burner mounted on a four-foot stand. As many as 15 persons, standing within five feet of the apparatus, may receive proper therapeutic treatment in five minutes.*

Science News Letter, March 11, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 198.*

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